

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

To:

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WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/IB2004/003365

International filing date (day/month/year)
14.10.2004

Priority date (day/month/year)
24.10.2003

International Patent Classification (IPC) or both national classification and IPC
H01M8/02, H01M8/04, H01M8/06

Applicant
TOYOTA JIDOSHA KABUSHIKI KAISHA

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

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**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/B2004/003365

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
☐ a sequence listing
☐ table(s) related to the sequence listing
 - b. format of material:
☐ in written format
☐ in computer readable form
 - c. time of filing/furnishing:
☐ contained in the international application as filed.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

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**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/B2004/003365

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-13
	No: Claims	
Inventive step (IS)	Yes: Claims	3, 4, 5, 10, 12
	No: Claims	1, 2, 6-9, 11, 13
Industrial applicability (IA)	Yes: Claims	1-13
	No: Claims	

2. Citations and explanations

see separate sheet

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Re Item V

**Reasoned statement with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement**

1. Reference is made to the following documents:

D1: US 2003/077487 A1 (ROBERTS JOY A ET AL) 24 April 2003 (2003-04-24)

D2: US-A-5 441 821 (MERRITT ET AL) 15 August 1995 (1995-08-15)

D3: PATENT ABSTRACTS OF JAPAN vol. 1997, no. 12, 25 December 1997 (1997-12-25)
& JP 09 209810 A (FUJI HEAVY IND LTD), 12 August 1997 (1997-08-12)

D4: US-A-3 748 180 (CLAUSI J,US ET AL) 24 July 1973 (1973-07-24)

D5: EP-A-1 223 631 (GENERAL MOTORS CORPORATION) 17 July 2002 (2002-07-17)

2. Novelty

The subject-matter of claims 1-13 is considered to be novel, Article 33 (2) PCT, for the following reasons:

No prior art document discloses an abnormality detecting device for a fuel cell system which is placed in the hydrogen off-gas circulation passage, downstream of the hydrogen discharge valve, wherein the abnormality detecting device comprises gas state quantity detecting means and means which detect abnormalities in the opening/closing of the hydrogen discharge valve.

3. Inventive Step

The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claims 1, 2, 6-9, 11 and 13 does not involve an inventive step in the sense of Article 33(3) PCT.

The document D1 is regarded as being the closest prior art, disclosing a fuel cell stack with a hydrogen off-gas circulation passage comprising valves, a pump and a knock-drum to separate water from gas. The hydrogen off-gas can either be recirculated or discharged from the passages.

The documents D2-D5 disclose abnormality detecting devices which determine either

pressure, temperature or voltage. All determination devices are applied in a fuel cell system to detect leakage or abnormalities in fluid passages of the fuel cell circulating system.

Since these abnormality detecting devices are by nature not bound to any specific place of the fuel cell circulation passages, the skilled person is free in his choice to apply them at any place suitable for measurement in the system.

Consequently, no inventive activity can be derived by placing the detection unit downstream of the hydrogen discharge valve.

4. Industrial Applicability

The subject-matter of the present application is industrially applicable in the field of fuel cell failure detection.

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